
5 MITIGATION MEASURES

The following measures will be implemented as part of the proposed action to mitigate the impacts of the replacement hospital facility on the North Post site of Fort Belvoir.

5.1 Land Use

As described in [Subchapter 4.1](#), the proposed heliport in the eastern portion of the North Site would represent an incompatible land use. The area proposed for the heliport is mapped as “Environmentally Sensitive,” and such a land use category does not allow for this type of development.

- The proposed heliport will be relocated to another portion of the site or to another site to eliminate the identified land use conflict. If a new site is found to eliminate land use conflicts, all necessary environmental documentation will be prepared to assess potential impacts.

To reinforce the North Post site and vicinity as the “Town Center” of Fort Belvoir, the site plan of the replacement hospital would be evaluated to maximize opportunities to increase pedestrian activity, particularly given the existing adjacent land uses – the PX/Shopping Mall and the Commissary. Mitigation measures to reinforce pedestrian use that will be implemented include:

- The existing multi-use trail along John J. Kingman Road will be extended along a portion of Gunston Road and tied into an extension to be provided along Gorgas and Stonewall Jackson Roads.
- Sidewalks will be provided from the hospital site to the PX and the Commissary. Brick pedestrian cross walks will be provided at road crossings.
- Consideration will be given in developing the site plan to develop ways to substantially reduce the distances that potential users of the new hospital facility would have to walk from the extensive parking areas to the main hospital building.

5.2 Community Facilities and Services

Per [Subchapter 4.3](#), the existing scouting camp area on the North Post site would be eliminated because of the proposed action. To mitigate this impact, Fort Belvoir:

- Will identify a new camp area with comparable characteristics (land area, setting, facilities, etc) on the Installation for use by the Boy/Girl Scouts of America.
 - Relocate the composting toilet from the existing Boy/Girl Scout area.
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5.3 Air Quality

As presented in [Subchapter 4.5](#), an exceedance of the NAAQS was predicted for the 24-hour short-term SO₂ ambient level based on a conservative estimate of emission rates and the preliminary design of the central energy plant boiler and emergency generator system. Mitigation measures to eliminate the NAAQS violation will include:

- Increasing the central energy plant and emergency generator stack heights. A Good Engineering Practice (GEP) stack height of 62 ft (18.9 m) was assumed for both stacks in a mitigation dispersion modeling analysis. As presented in [Table 5-1](#), no violations were predicted, including the 24-hour SO₂ ambient concentration level. Therefore, a stack height increase will be an effective mitigation measure to eliminate the predicted air quality violation, and will be evaluated further when the air permit and the central energy plant design are finalized.
- Using fuel with lower sulfur content (for instance 0.05 percent, as opposed to 0.5 percent as assumed in the analysis).

Cumulative impacts indicate that future development projects, to include the central energy plant boiler system and associated generators, will produce emissions that exceed the non-attainment New Source Review (NSR) threshold level of 25 tons. This will require that:

- All new Fort Belvoir air emissions sources will implement LAER technology and obtain emission offsets to satisfy NSR regulatory requirements. Although the central energy plant by itself does not exceed NSR levels, Fort Belvoir Command is committed to require LAER for all new emission sources as a means of mitigating the expected net emissions increases and reducing or limiting overall emissions postwide.

Table 5-1

Predicted Maximum Ambient Criteria Pollutant Concentrations under GEP Stack Height Condition

Pollutant	Averaging Time	Maximum Ambient Air Concentrations (ig/m ³)		Ambient Air Quality Standards	
		Increase	Total	Primary	Secondary
Nitrogen Dioxide (NO ₂)	Annual Arithmetic Mean	1.2	18	100	100
Particulate Matter (PM10)	6 th Highest over 5 years Annual Arithmetic Mean	5.3 0.1	59 23	150 50	150 50
Particulate Matter (PM2.5)	6 th Highest over 5 years Annual Arithmetic Mean	5.3 0.1	42.8 14.2	65 15	65 15
Sulfur Dioxide (SO ₂)	3-hour Second Highest 24-hour Second Highest Annual Arithmetic Mean	420 131 0.6	568 227 30	--- 365 80	1300
Carbon Monoxide (CO)	1-hour Second Highest 8-hour Second Highest	106 30	3,551 2,697	40,000 10,000	
Notes: <ul style="list-style-type: none"> • All concentrations are in micrograms per cubic meter of air. • Computed concentration totals are increases due to the central energy plant operations plus maximum background concentrations summarized in Table 3.5-3. • NO₂ and SO₂ concentrations are conservatively assumed to be the same as NO_x and SO_x levels, respectively. • PM2.5 concentrations are conservatively assumed to be the same as PM10 levels. 					

5.4 Cultural Resources

As described in [Subchapter 4.8](#), the North Post Site Alternative would require clearing vegetation and constructing a service road immediately adjacent to Lacey Cemetery. To reduce the loss of vegetation and prevent any future accidental impacts, Fort Belvoir would:

- Remove the long unused parking lot to the north of the cemetery and reforest it to provide additional forest cover.
- Replace the vegetative buffer around the cemetery.
- Redesign the service roadway to allow for a buffer between the road and the cemetery boundary.

5.5 Natural Resources

The proposed construction on the North Site would result in disturbing 22.3 ac (9.0 ha), of which 18.7 ac (7.6 ha) is forested with well-developed second growth forest. This would represent a 0.37 percent loss of forest on the Main Post, as well as a substantial loss of wildlife habitat. The site adjoins the Forest and Wildlife Corridor on two sides (although separated by roads), and the fragmentation of a 43 ac (ha) tract into four remnant pieces would diminish the value of the remaining forest fragments for wildlife considerably, particularly for the neotropical bird species that use the site as breeding habitat. Mitigation measures for this loss of forest communities and wildlife habitat will be to:

- Continue evaluation of parking alternatives with the goal of minimizing environmental impacts.
- Reconfirm the importance of the Forest and Wildlife Corridor by establishing a monitoring program specifically for the section of the corridor that would be most affected by clearance of the forest on the North Site. If it found that there is a decline in wildlife and plant populations in the vicinity of the hospital, then the boundaries of the corridor will be reevaluated to determine if they need to be expanded.
- Commit to preserving and enhancing the natural vegetation cover in the two “Constrained” or “Environmentally Sensitive” areas that will remain to the east and west of the hospital site.
- Maintain a vegetation buffer along the south side of Kingman Road (to the extent compatible with hospital access) to connect the two Environmentally Sensitive land areas and to act as a buffer between the Forest and Wildlife Corridor and the developed hospital facilities.
- Commit to no incursions into the Forest and Wildlife Corridor to clear vegetation or disturb the land to widen John J. Kingman Road in the future.
- Salvage rare or striking plants, such as populations of pink lady slippers now found on the North Site, and replant them elsewhere in suitable habitats on Fort Belvoir.
- Include wildlife-sensitive designs/materials/operations in planning for facility lighting and window treatments and other features of the facilities, to minimize disturbance and hazards to wildlife.
- Adhere to the principles of low impact landscape design and maintenance, including using native plants – particularly xeric plants that require little water – to reduce watering

demands, using water-efficient practices, and integrated pest management to reduce or eliminate the need for pesticides, as detailed in Section 10 of the INRMP.

- Mitigate the loss of wetlands by replacing them on a 2:1 basis elsewhere on the Installation in accordance with Virginia Water Protection General Permit Regulations For Impacts Less Than One Half Acre (9 VAC 25-660-10 et seq.).
- Mitigate the loss of streams by replacing them with wetlands on a 1:1 basis under the Virginia Water Protection General Permit Regulation for Impacts Less Than One Half Acre (9 VAC 25-660-10 et seq.), which covers permits for the removal of perennial streams up to 125 linear feet and non-perennial streams up to 1,500 linear feet.
- For each tree removed during construction, two trees would be planted on site, if possible, in bioretention areas and drainageway buffers, in accordance with the Fort Belvoir Directorate of Installation Support (DIS) Tree Removal and Protection Policy,. It is estimated that about 3,000 trees larger than 4 inches in diameter would be removed on the North Post site by construction of the hospital and its associated facilities, so 6,000 trees would need to be planted as mitigation. Should the trees need to be planted off-site, the Environmental & Natural Resource Division of DIS would identify an appropriate alternate location.

5.6 Stormwater

To mitigate the anticipated stormwater impacts of the proposed action, Fort Belvoir will require that the new hospital development result in a zero net increase in the quantity of stormwater runoff leaving the hospital site, based on a 10-year design storm, and a zero net increase in the contaminant loading of the runoff leaving the site. To satisfy this requirement, a rigorous stormwater management program will be formulated during the continuing design of the hospital and implemented during project construction and hospital operation..

The stormwater management program will comprise the following principal elements:

- **Formulation of stormwater management objectives, evaluation criteria, and definition of success** – Using the zero net increase (both quantity and quality) requirement as a goal, specific objectives for achieving that goal will be formulated, and evaluation criteria and a definition of program success will be formulated. A Low Impact Development (LID) Strategy will be favored to formulate the stormwater management objectives. Priority will be given to LID techniques that meet the zero runoff increase goal, such as the use of bioretention systems, rainwater gardens, wet ponds, and stormwater wetlands, among others on the candidate action list below.

- **Formulation and implementation of a monitoring, appraisal, and feedback program** – A stormwater monitoring program will be formulated and implemented to periodically collect data on runoff, stream channel, water quality, and habitat variables and the response of the stream systems to stormwater management actions. Monitoring will be initiated before the start of project construction, and will continue for a period of five years after the start of construction. Periodic appraisals will be executed to evaluate the success of the stormwater management actions undertaken under the program, and a feedback mechanisms will be integrated into the program to ensure that appropriate and responsive actions are undertaken to correct identified problems before they become prohibitively complex or expensive to correct.
- **Design, prioritization, scheduling, and implementation of stormwater management actions** – The specific stormwater management actions to be undertaken will be selected during formulation of the stormwater management program, as will the scheduling of the selected actions. [Table 5-2](#) provides a list of candidate actions. Priority will be given to nonstructural techniques to control stormwater volume, and bioretention systems, using the biological activity of plants and microbes, to control stormwater quality. The selected stormwater management actions will be implemented during construction of the hospital.

Table 5-2

Candidate Stormwater Management Actions

Impervious Surface Reduction Configuring Project Features Retention Of Existing Vegetation Shared Parking Structured Parking Parking Lot Design Roadway Design Permeable Pavements Turf Pavers Green Rooftops/Eco-Roofs	Constructed Wetlands Stormwater Wetlands Wet Swales
Infiltration Systems Infiltration Basins Infiltration Trenches Soakaway Pits Rainwater Gardens	Retention Systems Wet Ponds Extended Storage Ponds Wet Vaults/Underground Vaults Roof-Top Rain Retention Roof Water Cisterns
Filtration Systems Bioretention Systems Surface Sand Filters Underground Filters Vegetated Filter Strips Land Surface Treatment	Detention Systems Dry Ponds Oversized Pipes Oil/Grit Separators Dry Swales
	Flow Control Structures Permeable Weirs Flow Splitters Proprietary Flow Control Devices

- **Periodic evaluation and implementation of additional stormwater management actions** – The effectiveness of stormwater management actions undertaken will be evaluated periodically, and progress toward the management objectives will be assessed. As necessary, and in accordance with action thresholds to be specified in the management program, additional, supplemental stormwater management actions will be implemented to address objectives that have not been met.
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5.7 Transportation

This project would not result in significant impacts to area intersections because there would be no increase in either workers at or visitors to the new hospital above those working at or visiting the existing DeWitt Hospital. Nevertheless, Fort Belvoir is committed to increasing the use of ridesharing and mass transit to reach the Post, recognizing that it is a major traffic generator in this part of Fairfax County and that traffic is one of the cumulative impacts that is arising from a number of recent projects that have resulted in an increase in personnel on the post.

Fort Belvoir is currently in the process of finalizing plans for a mass transit study of the entire Post. Plans are to complete the study by the end of 2002. Fort Belvoir will:

- Vigorously pursue this mass transit study and complete it in a timely manner.
 - Apply measures to improve transit, based on what is learned. The study will collect data on existing commuter patterns, analyze the data to identify problems and opportunities, and investigate potential feasible options for high quality transit, rideshare opportunities available to the Post.
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5.8 Energy Conservation

By closing the current hospital, the Post's central energy plant, steam plant building 1422, will become significantly underutilized. This plant was completely upgraded in the last 12 months and now provides high pressure steam using three six hundred horsepower boilers operating with natural gas and No. 2 heating oil. To mitigate the future loss of the capacity now being used by the DeWitt Hospital:

- Within the next six months, Fort Belvoir will undertake an energy strategy study for the full utilization of the central energy plant. The approved study will be incorporated into the Installation's Master Plan.

- The facility will comply with all Installation water and energy conservation policies, directives, and regulations.
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5.9 Sustainable Design

The replacement hospital would incorporate the practice of sustainable design and development (SDD) that infuses environmental and sustainable considerations into Installation design and development processes. SDD integrates the decision-making process across Army Installations, basing decisions on the greatest long-term benefits, building on natural processes and energy cycles.

One of the tools developed to implement SDD is the Sustainable Project Rating Tool (SPiRiT), a process for scoring and rating Installation facility projects as Bronze, Silver, Gold, and Platinum. The elements that comprise the SPiRiT score include:

- Sustainable sites.
- Water efficiency.
- Energy and atmosphere.
- Materials and resources.
- Indoor environmental quality.
- Facility delivery process.
- Current mission.
- Future mission.

The goal for the DeWitt replacement hospital facility will be “silver” SPiRiT rating.
